



THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

Liberty Utilities (Granite State Electric) Corp.
d/b/a Liberty Utilities

Petition to Approve Battery Storage Pilot Program

Docket No. DE 17-189

Technical Statement of Heather M. Tebbetts

November 15, 2018

A. Purpose of Technical Statement

On December 1, 2017, Liberty Utilities (Granite State Electric) Corp. ("Liberty" or "the Company") filed its proposal for a battery storage pilot program. On February 9, 2018, the Company filed supplemental testimony and a benefit/cost analysis to provide further information about the pilot. Limited revisions to the original and supplemental filings were subsequently submitted. On April 9, 2018, the Company filed a technical statement containing additional information regarding the pilot program proposal.

After rounds of discovery, testimony from parties, and further discussions about the pilot, Staff and a majority of the parties have reached a settlement agreement and the following describes the updates to the program embodied in that agreement.

B. Pilot Overview

1. Program Size and Phasing

The pilot program will include two Phases, with Phase 1 implemented near-term and Phase 2 deferred and conditional on results of Phase 1. Phase 1 will incorporate up to 200 Tesla Powerwall 2 batteries. The program requires customers to receive two Tesla Powerwall 2 batteries and one gateway.

Phase 2 will incorporate up to an additional 300 Tesla Powerwall 2 batteries if the following conditions of Phase 1 are met:

- a) Liberty Utilities has installed a minimum of 100 batteries which have been operational and controlled for dispatch for at least 18 months;
- b) Liberty Utilities has achieved an average monthly coincident peak forecasting accuracy of at least 75 percent determined with reference to expected peak hour kWh reduction achieved during actual peak hours in connection with either the full 18-month Phase 1 period or the most recent 12-month period during Phase 1;
- c) Liberty Utilities has realized RNS and LNS and FCM cost savings during Phase 1 that are not less than projected in the submitted benefit-cost analyses, taking into account and adjusting for changes in actual rates or clearing prices
- d) Liberty Utilities demonstrates to the Commission that the investments necessary to implement Phase 2 have a forecasted net present value that is

- positive, after incorporating Liberty’s historical average peak forecasting accuracy, updated information about applicable RNS/LNS transmission rates, and other updated assumptions for benefits and costs; and
- e) There has been no material adverse change in any relevant circumstances or criteria.

If Phase 2 is not approved, the Commission has the authority to examine whether it is prudent to continue Phase 1 based on a revised and updated benefit-cost analysis of alternatives regarding the batteries installed in Phase 1.

2. Customer Contribution

Each customer participating will pay either an upfront payment per battery of \$2,433 or a monthly contribution of \$25 for each battery for ten years. Both types of payments will be treated as Contributions in Aid of Construction (CIAC).

3. Time-of-Use Rates

Customers participating in the pilot program will be required to take time-of-use (TOU) rates for Distribution and Transmission, and, unless the customer is enrolled with a competitive electric power supplier, Energy Service charges. The TOU rate design is cost-based. The TOU periods and illustrative rates at the beginning of the pilot program are provided below:

Summer Period (May 1 to October 31)

Weekdays:

Mid-Peak:	8:00 a.m. through 3:00 p.m.	\$0.1526 per kWh
Critical Peak:	3:00 p.m. through 8:00 p.m.	\$0.3644 per kWh
Off-Peak:	8:00 p.m. through 8:00 a.m.	\$0.0683 per kWh

Weekends:

Mid-Peak:	8:00 a.m. through 8:00 p.m.	\$0.1526 per kWh
Off-Peak:	8:00 p.m. through 8:00 a.m.	\$0.0683 per kWh

Winter Period (November 1 to April 30)

Weekdays:

Mid-Peak:	8:00 a.m. through 3:00 p.m.	\$0.1668 per kWh
Critical Peak:	3:00 p.m. through 8:00 p.m.	\$0.3567 per kWh
Off-Peak:	8:00 p.m. through 8:00 a.m.	\$0.1302 per kWh

Weekends:

Mid-Peak:	8:00 a.m. through 8:00 p.m.	\$0.1668 per kWh
Off-Peak:	8:00 p.m. through 8:00 a.m.	\$0.1302 per kWh

The illustrative rates shown above are the starting rates and will be adjusted from time to time as the underlying costs components change. The model used to calculate these rates will be used to calculate future rate changes.

4. Non-Wires Alternative

The Company's original filing included a non-wires alternative (NWA) proposal whereby the Company would install batteries on the 11L1 circuit in West Lebanon to reduce capacity during peak events. The parties have agreed that, while there may be value in utilizing distributed energy resources (DERs) for the purpose of deferring or eliminating the need for distribution system investments, the optimal venue for comprehensive analysis of an electric distribution utility's planned capital investments for evaluating NWA candidates is the least cost integrated resource plan (LCIRP) docket. The Company has agreed to include a detailed assessment of its distribution system needs in its next LCIRP due July 2019, which will include (1) Substation, Circuit, and/or Facility ID: identify the location and system granularity of grid need; (2) distribution service required: capacity, reliability, and resiliency; (3) anticipated season or date by which distribution upgrade must be installed; (4) existing facility/equipment rating: MW, kVA, or other; and (5) forecasted percentage deficiency above the existing facility/equipment rating over five years.

5. Bring Your Own Device Program (BYOD)

A Working Group, the composition of which is described in the Settlement, will convene to design a BYOD component of the pilot. The Working Group will provide recommendations for a filing to the Commission within four months of a Commission Order approving the Settlement. Aggregators will have the opportunity to provide up to 500 batteries (or the capacity equivalent of 2,500 kW), customers may acquire batteries from parties other than Liberty, may rely on one or more third-party aggregators to dispatch the batteries for purposes of coincident system hourly peak load reduction, and may take retail transmission and distribution service, and default energy service, if applicable, from Liberty, in accordance with the TOU rates, provided that no less than 25% of BYOD participating customers shall be on TOU rates. The Working Group will issue a request for information (RFI) to inform the program design with a competitive solicitation and accreditation process to choose one or more participating aggregators.

The competitive process will include a request for proposals (RFP) based on the program designed by the Working Group. To qualify for participation, an aggregator will be responsible for the costs associated with metering and communications, as well as transparent disclosure and consumer protection provisions, which will be developed by the Working Group. Liberty will engage in co-marketing and customer outreach with any accredited aggregator.

Once successful bidders are chosen and approved by the Commission, the BYOD component of the program will commence within three months, provided that the aggregators agree that they will not rely on Liberty dispatch instructions to discharge the batteries to the grid. If the aggregator's proposal relies on Liberty's dispatch instructions, they can only participate during the Phase 2 period. If aggregators participate in Phase 1, then they may include up to 200 batteries or the capacity equivalent during the Phase 1 period and in Phase 2 they may include up to an additional 300 batteries or the capacity equivalent of Liberty's capacity in total. If aggregators do not participate in Phase 1, then Phase 2 will provide for up to 500 batteries or the capacity equivalent of 2,500 kW during the Phase 2 period, if Liberty's Phase 2 is approved.

The inclusion of a potential BYOD component in the pilot program provides for competition and the opportunity for customers to choose the best program to suit their needs.

C. Benefit/Cost Analyses

The original Company proposal provided that customers would pay an upfront contribution of \$1,000 or a monthly payment of \$10 for ten years. The settling parties agree that the initial proposal of contribution was too low, and have agreed to an upfront payment as described in Part B above. Greater contribution from customers allows for a positive net present value for both phases combined, as well as each individual customer having an interest in utilizing his or her battery as designed considering the contribution to the equipment cost.

The benefit/cost analyses included in Attachments 1 and 2 to the Settlement include the following components:

1. Utility Cost Test vs. Total Resource Cost Test

During the course of the proceeding, parties reviewed multiple analyses, some utilizing the Utility Cost Test, others using the Total Resource Cost Test. The parties agree that the Utility Cost Test is the most appropriate test for this pilot because this test most accurately represents the costs and benefits of a distribution system investment from the perspective of the utility and its customers.

The results of the test are presented as a net present value calculation of the lifetime savings and costs of the proposed pilot program.

The benefits include the avoided costs of regional and local transmission charges and capacity market charges. The costs include the total costs to implement the program, including program costs such as administration, marketing, and plant investment. One of the strengths of the Utility Cost Test is its ability to address many types of programs, such as renewable energy projects owned by the utility, and in this case battery storage.

2. Regional Network System (RNS) Local Network System (LNS) Rates

The analysis provides estimated RNS rates from ISO New England for years 2019 through 2022, then assumed an increase of 4.66% for the remaining years. The estimated LNS rates are based on historic bills from National Grid to Liberty Utilities.

3. Avoided Costs

The analysis provides annual avoided cost rates for the forward capacity market (FCM) based on the Avoided Energy Supply Costs (AESC) 2018 Wholesale Capacity Value pricing (for cleared resources based on the FCM auction prices). Avoided costs from the AESC are also used to calculate avoided costs for the Company's energy efficiency programs.

4. Programming Costs

Liberty's billing system and meter data management system will require updates to

accommodate billing the TOU rates, along with reading cellular meters. The updated analysis includes the Company's billing system (Cogsdale) configuration and testing costs of \$102,185, which includes system configuration, regression testing, and support for bill presentment. The cost to upgrade the Itron MV-90 meter data management system is \$107,500 and will be performed by Itron and the Company.

5. Net Energy Metering Credit

As part of the Settlement terms, the parties agree that the costs associated with net energy metering (NEM) credits will be included in the analyses. These credits are those that customers will receive when Liberty exports power from the batteries to the grid for purposes of reducing coincident system peak load. The assumptions include the anticipated dispatch events annually and the degradation of the installed batteries over time. The analyses assume that Liberty will dispatch the battery four times per month.

6. Revised Calculation of Net Benefits and Net Present Value

The methodology used for the analyses includes modeling annual output of the batteries during peak events based on capacity and energy available. The model provides for degradation of the batteries over time, which Tesla's warranty provides will not exceed 30% degradation between years 0 through 10. The model allows for five percent (5%) battery removal after year 10 due to the fact that some customers may want to leave the program after 10 years. In addition, the success rate of achieving the peak hour is assumed to be 75% until year 10 and then decreases to 60% in year 11 and decreases by 10% thereafter to account for the fact that some batteries may degrade at a greater or lesser rate than 5% after year 10.

Phase 1

Phase 1 includes all of the programming costs associated with the battery pilot and provides a total nominal net benefit to all customers in Phase 1 of \$161,343, with a net present value of (\$138,037), as shown in Attachment 1, page 1.

Phases 1 and 2

Phase 2 provides an additional 300 batteries to provide benefits to customers. Attachment 2, page 1 provides for a total nominal net benefit to all customers for both Phases of \$842,513, with a net present value of \$8,470.

D. RSA 374-G

The Company proposed the pilot program in accordance with RSA 374-G, which requires the Commission to determine that the investment and resulting rate recovery are in the public interest prior to authorizing cost recovery of the investment. As part of that determination, the Commission is required to undertake balanced consideration of and give proportional weight to nine specific factors:

- a) The effect on the reliability, safety, and efficiency of electric service.
- b) The efficient and cost-effective realization of the purposes of the renewable portfolio standards of RSA 362-F and the restructuring policy principles of RSA 374-F:3.

- c) The energy security benefits of the investment to the state of New Hampshire.
- d) The environmental benefits of the investment to the state of New Hampshire.
- e) The economic development benefits and liabilities of the investment to the state of New Hampshire.
- f) The effect on competition within the region's electricity markets and the state's energy services market.
- g) The costs and benefits to the utility's customers, including but not limited to a demonstration that the company has exercised competitive processes to reasonably minimize costs of the project to ratepayers and to maximize private investment in the project.
- h) Whether the expected value of the economic benefits of the investment to the utility's ratepayers over the life of the investment outweigh the economic costs to the utility's ratepayers.
- i) The costs and benefits to any participating customer or customers.

As part of my Supplemental testimony filed on February 9, 2018, Bates pages 3 through 13, I discussed how the program design and the resulting benefits to customers comply with RSA 374-G.

The primary goal of this pilot program is to reduce RNS/LNS transmission and FCM capacity charges that the Company pays on behalf of its customers. Reducing coincident system peak demand, which lowers these charges will provide financial benefits to the Company's customers. In addition, in the event of an outage, these batteries will be disconnected from the Company's distribution system through the gateway, which will ensure employee and public safety during restoration efforts, while providing backup power supply to participating customers.

When battery storage is paired with renewable energy resources, e.g., customer-sited solar installations, the batteries installed in connection with this pilot program will increase the efficiency of the renewable energy resources. The battery storage will allow customers to have greater utilization of the renewable energy produced onsite, by storing the electricity during times of high electric production, which can be used during times of high electric consumption.

The Company also expects to contract with local, authorized Tesla Powerwall 2 installers to install the program batteries at customers' premises. These local contractors will be selected through a competitive RFP process. The utilization of local businesses to perform these installations will have a positive effect on economic development in New Hampshire. The number of contractors who will perform these installations will be determined based on the responses the Company receives through the RFP process.

Installation of battery storage at customers' homes will provide a backup source of power for those customers during system outages. Currently, the predominant technologies used by customers in New Hampshire to provide backup electric

service during an outage are fossil fuel-powered generators. The use of battery storage for electric backup during outages will reduce air emissions at customers' homes, which will have a positive effect on the New Hampshire environment.

As shown in the Attachment 2 benefit-cost analysis, the benefits of the program over the period will provide nominal net benefits to all customers of over \$800,000, and a net present value estimated at \$8,470, with participating customers potentially receiving higher benefits due to the design of the TOU rates.

E. Conclusion

The parties to the docket have diligently worked for the past eleven months to bring to the Commission a well-designed battery storage pilot program that allows for customer savings and customer engagement, as well as data collection to help inform future capital investments, including potential utility grid investment alternatives.

Approval of this proposed pilot program will inform future development of distributed energy resources in the region and the Company is pleased to be the first in New Hampshire to request approval of a pilot of this type.